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**Title: BIRMINGHAM SCIENCE EDUCATION PARTNERSHIP (BSEP) PHASE I****Grant Number:** 5R25RR015633-04**Project Start Date:** 9/29/2000    **Project End Date:** 8/31/2005**Institution:** UNIVERSITY OF ALABAMA AT BIRMINGHAM    **Tel:** 2059345266  
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**ABSTRACT**    DESCRIPTION (Adapted from the applicants abstract): The University of Alabama at Birmingham, McWane Science Center and the Birmingham City Schools (BCS) propose a highly coordinated program to provide high school science teachers and their students with a laboratory-based learning experience in genetic and molecular biology and the application of these fields to advances in modern medicine. While all of the programs described here are based on providing a high level of science content training to the participating teachers and students the primary goal will be to provide them with an opportunity to explore, by experimentation, the molecular world. The Birmingham Science Education Partnership (BSEP) integrates five highly successful existing programs with three new initiatives. To achieve the greatest impact these programs are highly interrelated and will provide maximum flexibility so that all BCS high school students will gain a better knowledge of new and exciting advances in health sciences. The combined programs will: 1) train BCS teachers in molecular biology during a summer course, BioTeach, taught by the UAB faculty and students; 2) provide BioTeach graduates with five molecular biology laboratory modules in their classrooms; 3) provide BCS teachers the opportunity to bring their classes to the GENEius program at McWane Science Center to conduct day-long experiments in DNA fingerprinting and the genetic basis for sickle cell anemia; 4) develop and build exhibits at McWane Center to help the public better appreciate experiments conducted by students in the GENEius program; 5) expand the development and dissemination of inquiry-based Genetics and Microbiology courses in the BCS; 6) strengthen existing high school science club curricula by offering long-term projects including genome analysis and infectious diseases; 7) expand the current summer internship program for high school students to include training in basic molecular concepts and laboratory skills; 8) recruit and train undergraduate Outreach fellows to serve as facilitators in high school classroom programs. Several factors contribute to the likely success and sustainability of the BSEP. First, the partners are the major contributors to biomedical research and science education in Birmingham. Second, substantial commitment of resources in the form of State funds, private and federal grants and physical facilities are available to the programs described in this proposal. Third, the partner institutions have a track record of working effectively together, drawing from their varied expertise, to provide exciting and innovative science education programs.

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**Title: PARTNERS IN BEHAVIORAL HEALTH SCIENCES/PHASE I AND II****Grant Number:** 5R25RR015976-04**Project Start Date:** 9/15/2000    **Project End Date:** 8/31/2005**Institution:** UNIVERSITY OF ARKANSAS MED SCIS LTL    **Tel:** 5016865502  
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**ABSTRACT**    DESCRIPTION (Adapted from the applicants abstract): The major goal of this program, Partners In Behavioral Health Sciences (PIBHS), is to develop and evaluate a science-based educational program on the biology, etiology, prevention and treatment of mental illness through a partnership of researchers, clinicians and primary and secondary educators and school personnel. This program will consist of Phase I and Phase II. In Phase I, six modules will be developed, focusing on mental health disorders with substantial scientific grounding, high rates of prevalence and severity, and/or availability of evidence-based treatments. This program will target three populations: teachers and school personnel, students and the general public. The educational design will include summer teaching sessions, presentations at state-wide meetings, interactive tele-video sessions, collaboration with the science museum, student internships as well as the development of teacher tool kits, classroom resources, computer assisted interactive programs, videotapes and other experiential learning materials. Phase I will also consist of a two-tiered evaluation in which changes in knowledge, attitudes and behaviors of participants will be monitored through pre- and post-course surveys. A more intensive evaluation is also proposed using a controlled match research design in which the effectiveness of the educational program will be tested by evaluation outcomes in participating and non-participating schools. Regional dissemination will occur in this phase through partnerships with statewide school personnel, science museum curators, and other professional associations. In Phase II, the investigators will engage in widespread dissemination through established networks in southern, rural states and collaborations with national organizations. This application proposes to address the following specific objectives: 1) improve awareness of the technological advances in the recognition, prevention and treatment of mental disorders in K-12 teachers, students and the general public; 2) reduce stigma by dispelling myths about mental illness; 3) enhance access to mental health services for students and teachers; and 4) increase student interest in the science of mental illness. This program is designed to reflect a cultural and ethnic sensitivity to minorities and children.



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**Title: MEDICAL IGNORANCE (QQQ) COLLABORATORY K12 CURRICULUM****Grant Number:** 5R25RR015670-04**Project Start Date:** 9/15/2000    **Project End Date:** 8/31/2005**Institution:** UNIVERSITY OF ARIZONA  
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DESCRIPTION (Adapted from the applicants abstract): Despite widespread recognition that scientific knowledge decays exponentially in this era of spectacular discovery, few appreciate the dynamic relationship between knowledge and its mirror image, ignorance. Nevertheless, the history of science and particularly medicine reveals that ignorance (both the unknown and a questioning attitude toward the known) is the true terra incognita of discovery. Phase I will further develop, adapt, and evaluate a K-12 version of the University of Arizona's (UA) internationally recognized brain on, hands on Curriculum on Medical Ignorance (CMI). CMI aims to nurture the spirit of inquiry, inculcate questioning habits of mind, and teach research skills by focusing on QQQ (the 3Qs c.f. 3Rs), namely the Questions [content - things we know we don't know (active research), things we don't know we don't know (future discoveries), and things we think we know but don't (false knowledge and error)] about disease and health; Questioning, the process, skills, and tools of scientific inquiry; and Questioners, the learners individually and together seeking answers. Through multifaceted multimedia activities arising at the Arizona Health Sciences Center (AHSC) and tailored to school needs, K-12 students/science teachers working with Ph.D. and M.D. scientists, including many from disadvantaged/ethnic minority/indigenous groups, will be exposed to doing science in clinical medicine, underlying basic biology, and overlying public health, largely in AHSC's specialized centers of excellence in cardiovascular disease (Sarver Heart Center), cancer (Sydney E. Salmon Comprehensive Cancer Center), genetics/genomics (Steele Memorial Children's Research Center), bone and joint diseases (Arthritis Center), neurosciences, respiratory diseases, and preventive medicine (new College of Public Health). Curricular offerings include closely mentored Summer Institute on Medical Ignorance (SIMI) with full-time laboratory/clinical research, seminars, visiting professors, a Research Forum to present findings, and career advising. The QQQ component will focus on teaching the thinking and doing of science and provide a workshop sequence for teachers (on site and teleconferenced) in an abbreviated/concentrated form of the summer CMI/QQQ classroom and curricular transformations accompanied by inservice followup assistance, leadership training, and minigrants to master teachers to make change happen. The Phase II dissemination component will take advantage of the evolving CMI/QQQ collaboration formed by high technology intramural and extramural infrastructure links to Arizona-wide school districts and national professional organizations [such as FASEB and American (Arizona) Medical Association] to enlarge the impact of CMI/QQQ programs, products and people; make remote sites accessible; promote replication and

innovation, and empower K-12 student/teacher leaders through showcasing accomplishments and assisting career development. An elaborate formative and summative evaluation system currently in place for CMI/QQQ will be continued and revised according to evaluative results, based on participant questionnaires/portfolios to document short- and long-term outcomes/career pathways/impact; external evaluation by exp



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**Title:** LIFE'S NEW FRONTIER: PUBLIC HEALTH GENETICS PHASE I/II

**Grant Number:** 5R25RR017381-02

**Project Start Date:** 9/28/2002     **Project End Date:** 8/31/2007

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**ABSTRACT** DESCRIPTION (provided by applicant): The Tech Museum of Innovation and Stanford University School of Medicine Department of Genetics have established long-term partnership to enable the public to draw connections between modern genetics research and choices they face about their health. Together we will develop, produce, evaluate, and disseminate Life's New Frontier, a dynamic exhibition which will inform the public about the goals and methods of modern genetics. Interactive permanent exhibits and guided learning centers, staffed jointly by museum educators and by working scientists (predominantly Stanford graduate students and postdoctoral fellows), will take the public into the minds and laboratories of scientists who are revolutionizing biomedical science. The exhibition and associated public and school programs will emphasize the emerging discipline of bioinformatics, which is fundamental to the Human Genome Project, gene-based diagnosis, rational drug design, and treatment of disease. Life's New Frontier will open in the summer of 2003 to reach an estimated 1.5 million diverse people annually through museum and online visitation. It will set a new standard for the treatment of cutting-edge science in exhibitions by establishing an infrastructure that permits rapid changes to exhibit content, and creating opportunities for visitors to receive personalized science and health updates after their visit. The exhibition also will serve as a platform to foster continuing personal interaction among middle and high school students, Stanford faculty and students, and the general public. The Tech/Stanford partnership will be maintained through staff liaison positions at each partner institution and will be evaluated to assess its effectiveness. We hope to extend this model to other departments at the Stanford University School of Medicine, and to disseminate it as a model for other science center/university partnerships in biomedical sciences. We anticipate significant outcomes of this partnership: the public will be better able to apply the ideas of modern genetics to decisions about their health; and a broad range of students from diverse backgrounds will be inspired to pursue biomedical education and research.

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**Title: PUBLIC HEALTH ORGANIZATION AT MORSE & HELIX HS-PHASE II****Grant Number:** 5R25RR012389-06**Project Start Date:** 7/10/1998    **Project End Date:** 6/30/2004**Institution:** UNIVERSITY OF CALIFORNIA SAN DIEGO    **Tel:** 8585343330  
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**ABSTRACT**    DESCRIPTION (provided by applicant): During a Phase I study, a Science Education Partnership was established between the UCSD School of Medicine and an urban San Diego high school. UCSD faculty selected for excellence in teaching are grouped into four educational units: Adolescent Health, Biopsychology, Cancer/Genetics, and Infectious Diseases; each unit is assisted by the San Diego Science Alliance, a consortium of over 150 biotechnology corporations, institutions, and foundations, and by UCSD Student Health Advocates, undergraduate UCSD students trained to teach health-related topics. Students enter the program in the 10th grade and receive didactic training in all four units. In the 11th grade, students choose a specific unit and participate in small group seminars and in field trips relevant to their unit; in addition, students present a talk on a health topic of their choice. In the 12th grade, students present their talks to 5th-9th grade students, but only after careful review of the talks by UCSD faculty and high school and elementary school teachers. Thus, information the students have learned is disseminated to younger students and the program incorporates a carefully-supervised peer teaching model. Analysis of intermediate-point data suggests the program has successfully increased students' knowledge and interest in health-related careers. We have extended the program to a second urban high school and during Phase II we will continue to evaluate the full three year program to a second urban high school and during Phase II we will continue to evaluate the full three year program but we will also determine the efficacy of a one or two year program. In addition, a public health organization will be established to allow the peer teaching paradigm to be expanded widely by having students generate educational materials to be provided to other schools. These materials will teach students about health issues, will demonstrate to schools how to set up similar public health organizations, and will provide teachers detailed descriptions of strategies to integrate health-related issues into biology, chemistry, and coordinated science classes. As a result of data generated during the Phase I study, a parent education program and a student summer research program will be added to the partnership.

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**Title: PUBLIC HEALTH ORGANIZATION AT MORSE & HELIX HS-PHASE II****Grant Number:** 3R25RR012389-05S1**Project Start Date:** 7/10/1998      **Project End Date:** 6/30/2004**Institution:** UNIVERSITY OF CALIFORNIA SAN DIEGO      **Tel:** 8585343330  
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**ABSTRACT**      DESCRIPTION (provided by applicant): During a Phase I study, a Science Education Partnership was established between the UCSD School of Medicine and an urban San Diego high school. UCSD faculty selected for excellence in teaching are grouped into four educational units: Adolescent Health, Biopsychology, Cancer/Genetics, and Infectious Diseases; each unit is assisted by the San Diego Science Alliance, a consortium of over 150 biotechnology corporations, institutions, and foundations, and by UCSD Student Health Advocates, undergraduate UCSD students trained to teach health-related topics. Students enter the program in the 10th grade and receive didactic training in all four units. In the 11th grade, students choose a specific unit and participate in small group seminars and in field trips relevant to their unit; in addition, students present a talk on a health topic of their choice. In the 12th grade, students present their talks to 5th-9th grade students, but only after careful review of the talks by UCSD faculty and high school and elementary school teachers. Thus, information the students have learned is disseminated to younger students and the program incorporates a carefully-supervised peer teaching model. Analysis of intermediate-point data suggests the program has successfully increased students' knowledge and interest in health-related careers. We have extended the program to a second urban high school and during Phase II we will continue to evaluate the full three year program to a second urban high school and during Phase II we will continue to evaluate the full three year program but we will also determine the efficacy of a one or two year program. In addition, a public health organization will be established to allow the peer teaching paradigm to be expanded widely by having students generate educational materials to be provided to other schools. These materials will teach students about health issues, will demonstrate to schools how to set up similar public health organizations, and will provide teachers detailed descriptions of strategies to integrate health-related issues into biology, chemistry, and coordinated science classes. As a result of data generated during the Phase I study, a parent education program and a student summer research program will be added to the partnership.

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**Title: QUATTRO ALLIANCE FOR SCIENCE AND LANGUAGE INTEGRATION****Grant Number:** 1R25RR018504-01**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2006**Institution:** UNIVERSITY OF CALIFORNIA SAN FRANCISCO    **Tel:** 4154769000  
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**ABSTRACT** DESCRIPTION (provided by applicant): The Science & Health Education Partnership (SEP) of the UCSF, in strong collaboration with the San Francisco Unified School District (SFUSD), proposes a National Institutes of Health (NIH) SEPA, the Quattro Alliance for Science and Language Integration. Through the Quattro Alliance, SEP will both develop a professional development program in science and language and undertake a comprehensive research, documentation, and dissemination effort. Quattro will establish a professional community of four groups of participants - elementary school teachers, UCSF volunteers, elementary English language learning (ELL) students, and a collaborative of evaluators - to promote the integration of science learning and language development in elementary schools and to increase access to rigorous science learning for ELL students in SFUSD. Science learning in this effort refers to engaging students in the development of both scientific concepts and investigation skills. Language development here refers to student understanding of the forms, functions, and vocabulary of scientific discourse. This effort will be accomplished through four specific aims: 1) to develop strong scientist-teacher partnerships grounded in the research literature on science & language teaching and learning; 2) to provide ELL students with access to rigorous science learning and the development of the skills required for academic discourse in science; 3) to establish a generative community of science educators who will develop a Framework of goals and concrete classroom strategies that can be used to integrate science learning and language development; 4) to create dissemination materials based on the generation of a Quattro Framework and evaluation data collected during the project to provide strategies for the integration of science and language to school districts and universities nationwide. These specific aims will be addressed through three integrated programmatic structures: 1) Quattro Beginning Coursework; 2) Quattro Science Clubs, and 3) the Quattro Professional Community. These efforts will employ three innovations in the integration of science and language learning. First, the project will engage significant numbers of both teachers and UCSF scientists and clinicians in partnership, a novel approach to the integration of language development and science learning. Second, this community of science educators will develop an evidence-based and accessible framework for integrating science and language teaching and learning in elementary school classrooms. Finally, the proposed effort will occur in a large, polylingual, urban school district. Documentation of the effort, analysis of evaluation data, and the generation of a framework for integrating science and language learning in the classroom will be assembled into dissemination materials designed for use by universities and school districts across the United States.

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**Title:** DENVER CARDIOVASCULAR HEALTH EDUCATION ALLIANCE, PHASE I

**Grant Number:** 5R25RR017253-02

**Project Start Date:** 9/30/2002     **Project End Date:** 8/31/2005

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**ABSTRACT**     DESCRIPTION (provided by applicant): The Cardiovascular Health Education Alliance for Denver Schools (CardioHEADS) is a biomedical education partnership between faculty at three middle schools in the Denver Public Schools District and three UC campuses to support inquiry-based teaming about cardiovascular health and disease. The goals of this partnership are to: 1) Improve understanding of cardiovascular health and disease, understanding of the process of scientific inquiry, and interest in health science careers among low-income, urban, ethnically diverse, public middle school students 2) Assist middle school science teachers to progress toward classroom practice that includes more emphasis on inquiry-based activities using age-appropriate CVHD as an organizing theme. The activities to support these goals include curriculum development, professional development of teachers, student contact with scientist role models, and access for teachers and students to science equipment to support inquiry-based teaming.





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**Title: HEALTHY PEOPLE 2010 PUBLIC LIBRARY INITIATIVE****Grant Number:** 5R25RR015601-04**Project Start Date:** 9/30/2000    **Project End Date:** 8/31/2005**Institution:** AMERICAN ASSOCIATION FOR THE ADV OF WASHINGTON, DC 20005    **Tel:** 2023266639  
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**ABSTRACT**    DESCRIPTION (Adapted from the applicants abstract): The AAAS proposes a five-year project to bring to the public the latest information about biomedical research, especially as it pertains to the goals of Health People 2010. We propose to work with libraries to create materials and disseminate information through a process that we established as part of our Science + Literacy for Health projects. This process involves combining carefully developed materials that make both the science content and the reading level accessible with a targeted outreach campaign that brings the information to people in a comfortable environment. Public libraries, like museums, are highly trusted and respected institutions within their respective communities and throughout this nation. Over 15,000 public libraries, of varying sizes, provide an increasingly wide range of services to their communities. For many of this nation's citizens, especially minority groups, the public library is a primary source of reliable information. Individuals seeking reliable, current, health information often turn to their public library. This information must be packaged in plain English to be accessible to these individuals. The materials that will be produced by the Healthy People 2010 Library Initiative will meet this need. Formative evaluation data will be solicited from this target group to ensure that the materials meet the needs of the intended audience. The Healthy People 2010 Library Initiative will produce seven plain-language booklets and develop a Healthy People 2010 Tool Kit for public libraries. The booklets and other materials will be tested in library outreach programs in low-income communities with large populations of African Americans and Hispanic Americans and in five urban areas in the first three years of the project. The materials will then be disseminated nationally to other public libraries and community-based organizations, and the impact of the program will be evaluated.

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**Title: KNOW YOUR BODY-HISPANIC COMM. SCIENCE EDUCATION PROJECT****Grant Number:** 1R25RR018481-01**Project Start Date:** 9/30/2003    **Project End Date:** 9/29/2006**Institution:** SELF RELIANCE FOUNDATION  
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DESCRIPTION (provided by applicant): The Self-Reliance Foundation (SRF) Conociendo Tu Cuerpo (Know Your Body) Hispanic Community Health Sciences Education project, is an initiative designed to introduce Hispanic students and families to biomedical science and health education resources and increase their participation levels in these fields. The educational goals of the project are to: 1. Encourage Hispanic undergraduate students to pursue careers in biomedicine and science, through a mentoring program at the University level, 2. Inspire an interest in biomedical science among Hispanic elementary-age students and parents through community outreach activities. 3. Inform Hispanic parents about biomedical science education standards and academic requirements for pursuing biomedical and science related careers, and 4. Inform and inspire Hispanic students and their families about the biomedical sciences and related careers through a series of daily nationally broadcast Spanish-language radio capsules, and a nationally syndicated Spanish newspaper column. Conociendo Tu Cuerpo (Know Your Body) includes several key components: A model, Washington, D.C. area coalition of informal science, health, community, education, and media organizations that will publicize and provide hands-on health science activities at community festivals, other community settings. Hispanic undergraduate Student Health-Science Fellows to be trained and provided experience in facilitating health science activities. Nationally broadcast, Spanish-language radio capsules that will cover topics in areas of biomedicine, research, education and health-science careers. Parents and students will be able to access additional information about biomedical science opportunities and Hispanic role-models in the biomedical sciences through the Project's Conociendo Tu Cuerpo website and the bilingual 800# helpline promoted by 147 participating radio stations and 102 newspapers nationwide. The project will be supported at the national level through collaboration with the Hispanic Radio Network and the Pacific Science Center. The Washington, D.C. collaborative will include the Capital Children's Museum, local Spanish language radio stations, area universities, and health and community organizations. Development Associates, the largest American education and evaluation consulting corporation, will evaluate the project.

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**Title: BIOTRAC NATIONAL REPLICATION PROJECT (PHASE II)****Grant Number:** 1R25RR018574-01**Project Start Date:** 9/30/2003    **Project End Date:** 9/29/2006

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**ABSTRACT** The Miami Museum of Science, in collaboration with University of Miami's (UM) School of Medicine, is requesting a Phase II grant to support national replication of the Biomedical Training, Research and College Prep (BioTrac) Project. The goal of Phase I, now in its final year of funding, was to develop a replicable model aimed at increasing the numbers of underserved students entering the biomedical research pipeline. Phase I focused on priority areas under Healthy People 2000 reflecting health issues of interest to the community as well as resources available through UM's Jackson Memorial Medical Center. Comprising hands-on project-based programming, career awareness activities, college prep, research internships and college residential experiences, the project has served 98 students to date, of whom 88% are low-income and 96% reside in homes where English is the second language. Of the 43 seniors who have graduated to date, 42 are enrolled in post-secondary studies. Of these, 52% have chosen a science-related major, and of these, 73% have chosen a biomedical course of study. Under the proposed Phase II project, the Museum will establish BioTrac as a national demonstration site, extending BioTrac strategies and materials to formal and informal science institutions (ISis) through site-based institutes, distance-learning opportunities and professional conferences and publications. Continued delivery of BioTrac programming at the demonstration site will also further increase the number of underrepresented students entering the biomedical research pipeline, and allow for further programming aimed at increasing public understanding of Healthy People 2010 priorities and biomedical research. The Museum will target ISis with youth programs to attend a 3-day replication institute, reaching a minimum of 30 ISis during the grant. Through participation in national conferences and professional development sponsored by the Association of Science-Technology Centers, representing 340 ISis, the model has the capacity to impact small, medium, and large science centers nationwide. The model will also be adaptable for use by the other 123 Upward Bound Math & Science Centers engaged in science enrichment programming for underserved youth. Finally, elements of the model will be suitable for extracurricular school-based science clubs and high school magnet programs focused on biomedicine, further extending the potential impact of the model to school districts nationwide.

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**Title: HAWAII SCIENCE TRAINING AND EDUCATION PROJECT (HISTEP)**

**Grant Number:** 5R25RR017312-02

**Project Start Date:** 9/26/2002    **Project End Date:** 8/31/2007

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**ABSTRACT**    DESCRIPTION (provided by applicant): The Hawaii Science Training and Education Project (HiSTEP) is a collaborative effort between the John A. Burns School of Medicine, the Hawaii Area Health Education Center, Bishop Museum, the Pacific Biomedical Research Center, the Biomedical Research Infrastructure Network (BRIN) of local colleges, and the University of Hawaii College of Education. The goal is to improve the general public's understanding of and interest in health sciences by increasing biomedical research education and mentoring activities for K-12 students and their teachers. This collaborative effort will allow students from all Hawaiian Islands to participate in health sciences programs by adapting successful curricula for K-12 students to the cultures of the area and integrating them into existing health careers recruitment programs. This project will fill in the gaps in health sciences recruitment and education programs across the state, provide an online resource for all individuals interested in health science careers in Hawaii, develop a statewide annual meeting of parties interested in health sciences and track students to determine program successes.

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**Title: KY HEROS—HEALTH EDUCATION RURAL OUTREACH SCIENTISTS****Grant Number:** 5R25RR015656-04**Project Start Date:** 9/30/2000    **Project End Date:** 8/31/2005**Institution:** LOUISVILLE SCIENCE CENTER, INC.    **Tel:** 5025616109  
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**ABSTRACT**    DESCRIPTION (Adapted from the applicants abstract): KY-H.E.R.O.S. (Health Education Rural Outreach Scientists) is a health science education program that partners the largest science center in Kentucky with Science Heroes-- important regional biomedical research scientists. The Science Heroes, their stories and their studies serve as inspiration to our rural audience. The project objectives are to: (1) Convey the relevance of health science research to people's daily lives and promote awareness of healthy lifestyle choices and wellness; (2) Promote understanding of the fundamental principles of the scientific process and inspire K-12 teachers to incorporate current research into their teaching of health science; and (3) Encourage students to pursue advanced science education and increase awareness of the wide range of health science related careers. The Science Center, working with the distinguished Science Heroes, their research teams and a group of 15 knowledgeable professional advisors will develop the new KY-H.E.R.O.S. science education program. The program will include new hands-on labs and demonstrations, teacher training workshops, career exploration activities, interactive videoconferencing distance learning links, and innovative public programs. Using museum-based exhibits and a wet lab, traveling exhibit components, telelinking (distance learning), an interactive website and printed and electronic materials, we will present information about the work of the Science Heroes and its relevance to the lives of participants. The focus of the program will change every two years to feature three different scientists and their work. A total of nine scientists will be included during the 5 year period covered by the SEPA grant. As the focus changes every two years to a different three scientists, all the programs and exhibits will be changed accordingly. KY-H.E.R.O.S. will be designed to serve audiences composed of school groups on field trips; teachers in workshops; classes in remote areas of the state participating through videoconferencing; underserved groups including economically disadvantaged, minorities and young women; and the family audience that makes up about 60% of the Science Center's annual attendance. Formative and summative evaluation will be conducted by an outside firm to ensure effectiveness.



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**Title: TYPICAL AND ATYPICAL BRAINS: SCIENCE EDUCATION****Grant Number:** 5R25RR013433-05**Project Start Date:** 7/3/1998      **Project End Date:** 8/31/2005**Institution:** UNIV OF MASSACHUSETTS MED SCH WOR      **Tel:** 5088562119  
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**ABSTRACT**      DESCRIPTION (provided by applicant): The goal of our SEPA project is to provide children with learning experiences that will establish the foundation for broad, socially connected understanding of how the brain works and how brain functioning relates to behavior. To develop our curriculum, we have taken advantage of the environment and resources of the Shriver Center, a center for interdisciplinary scientific research, training, and clinical service in mental retardation and developmental disabilities. Our project may be unique in that there is an explicit focus on illustrating the interactions among and integration of disparate scientific disciplines (neurobiology, cognitive neuroscience, genetics, etc.) that are necessary to understand scientific problems that none could understand alone. The project is also unique in that the curriculum covers typical and atypical development. By doing this, we hope to teach children that variations in development are normal and determined by understandable or potentially understandable interactions between genes, brain development, and environment. During Phase I of this project, our curriculum was developed, field tested, and extensively revised based on field-test results. In Phase II, we plan to develop, evaluate, and validate models of effective curriculum dissemination in schools and other educational settings. To this end, we will survey various informants (e.g., teachers, educational administrators, other SEPA project directors, etc.) to identify variables relevant to curriculum acceptability. We will also explore ways in which modern information technology can be used to support enhanced dissemination efforts. Subsequently, we will field-test different approaches to disseminating the curriculum.



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**Title: BROADENING OF A BASIC RACE & GENDER EQUITY PROG PHASE II**

**Grant Number:** 1R25RR018619-01

**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2006

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**ABSTRACT** DESCRIPTION (provided by applicant): The long-term goal of this project is to expand and disseminate our innovative intemship and near-peer mentoring models for minority youth and women in the biomedical sciences, thus increasing the number of minority students participating in the quantitative disciplines. Dissemination and expansion of the program will take place in three steps: 1) Within the National Capital Region through the Internet and co-operative arrangements with established educational initiatives within DCPS system. 2) For year 2, expand to one site outside the National Capital area. The site would be for a group that had already begun to model their fledgling program on our STARS program, or one of the specific sites discussed in Aim #3. The likely site would be at Ft. Monmouth, NJ, since Dr. Constella Zimmerman is planning to start a STARS initiative. 3) Extend the program to specific sites within selected cities, Utilize current contacts in states that do not yet have a SEPA program to disseminate our model program adapted to be appropriate for their needs. STARS, Student Training in Advanced Research Skills, is a rapidly maturing program that primarily serves underrepresented minority students of the National Capital Area. A one to four-week series of experiments provide basic laboratory skills, while illustrating the fundamental principles of science, mathematics, engineering and technology. Research scientists, in conjunction with their college assistants, design ageappropriate protocols relating to current Institute research.

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**Title: FRONTIERS IN PHYSIOLOGY: LOCAL SITE MODEL****Grant Number:** 1R25RR018573-01**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2006**Institution:** AMERICAN PHYSIOLOGICAL SOCIETY    **Tel:** 3015307118  
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**ABSTRACT** The Frontiers in Physiology: Local Site Model program will use the successful teacher professional development components generated through the Frontiers in Physiology: Integrating Inquiry, Equity, and Technology program (<http://www.the-aps.org/education/frontiers/index.htm>) to develop, evaluate, refine, and disseminate a long-term Frontiers local site model. This model will allow research departments and schools to use proven materials and methods to:

- . Develop collaborative teams of teachers and researchers to work together on outreach efforts;
- . Provide biomedical research experiences and workshops that improve middle/high school science teachers' content knowledge and preparation for inquiry-based teaching as well as providing a critical perspective on how biomedical/clinical research is done, how animals and humans are used in research, and how they benefit from biomedical and clinical research.
- . Develop long-term collaborative relationships with teachers from local school systems;
- . Provide frequent professional development opportunities and outstanding curricular materials for the teachers in their communities and surrounding areas to increase student understanding of and interest in science and health topics and science process skills; and
- . Increase researchers' knowledge and skills in how to serve as a resource for K-12 science and health education in their community and region.

Operationally, this development and dissemination project will work with two development sites in Years 1-3 (San Antonio, Texas and Indianapolis, Indiana) and with two dissemination sites in Years 3-5 (Vermillion, South Dakota and one site to be named). Program activities will include summer research fellowships for teachers, training and planning meetings for Frontiers Local Site Teams, and professional development workshops for local teachers that focus on integrating inquiry-based teaching, equity strategies, and effective integration of Internet technology in the life sciences classroom.

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**Title: THE PERFECT PARTNERSHIP: SCIENCE ENRICHED PHYSICAL ED****Grant Number:** 1R25RR015674-01A1**Project Start Date:** 2/1/2003      **Project End Date:** 1/31/2006**Institution:** UNIVERSITY OF MARYLAND COLLEGE PK C      **Tel:** 3104051000  
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**ABSTRACT**      DESCRIPTION (provided by applicant): The long term objective of this research is to design and field test a science-enriched elementary PE curriculum to increase students' knowledge and interest in health-related science. Minority students in urban public schools often do not acquire essential academic skills necessary to pursue science careers. Although interest in science may develop during adolescence, by middle or high school many students are academically so deficient they are unable to master technical knowledge essential for success. Stimulating students' interests in science, reading, and mathematics early in their schooling is critical to achievement. Many health-related scientific principles most relevant to young children involve concrete responses they can examine and understand. One salient set of principles explains the positive benefits of physical activity on health and well-being. Recent public health reports indicate that physical inactivity is a primary risk factor for coronary heart disease. PE can provide an exciting, active laboratory to examine health-related science concepts and principles. Specific project objectives are: 1. To determine if a science-enriched curriculum taught in PE can increase 3rd, 4th, and 5th grade students' knowledge of health-related science. Kinesiology or the scientific study of human movement is the disciplinary knowledge base for PE. PE programs reflecting a kinesiological focus communicate scientific knowledge about health-related benefits of physical activity to students. We hypothesize that kinesiological or science-enriched PE curricula can create an environment that increases students' knowledge of the body systems' responses to physical activity in a stimulating, enjoyable, and academically engaging atmosphere. 2. To determine if students' interactions with scientists increase their understanding of scientist's work, the scientific inquiry process, and their interest in science. While Objective #1 emphasizes the kinesiological knowledge base that will make PE an extension of the science Classroom and a viable science partner, Objective #2 examines the contributions that kinesiological scientists can make to students' understanding of the scientific process and interest in science. We hypothesize that students' interactions with distinguished NIH-funded scientists will contribute to a broader picture of the scientific enterprise and the value that students' place on scientific knowledge. Scientists will visit elementary schools and participate with students in experiments as part of the problem-solving, science-enriched PE curriculum. Students from three schools will be invited to the scientists' laboratories to participate in meaningful experiments to enhance their understanding of scientists' work, the inquiry process, and their interest in science.

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**Title: BRAIN TO MIDDLE SCHOOLS****Grant Number:** 5R25RR017315-02**Project Start Date:** 9/30/2002    **Project End Date:** 8/31/2007

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**ABSTRACT**    DESCRIPTION (provided by applicant): The University of Minnesota Department of Neuroscience (U of MN) and Science Museum of Minnesota (SMM), in conjunction with a teacher advisory group, propose to develop, implement, evaluate, and disseminate a model biomedical science education program in neuroscience. The project, BRAIN (Bringing Resources, Activities, & Inquiry in Neuroscience) to Middle Schools, will result in the development of in-depth, multiyear, inquiry-based curriculum materials and teacher training programs supported by a mentoring network, which will promote enhanced understanding and application of neuroscience and its health-related issues into middle school science curriculum. A pilot phase of this project produced a two-week professional development institute for grade 5 through 8 science teachers. During the school year, participating teachers were supported with classroom activities and resources including an assembly program, interactive exhibit stations, and a resource trunk. While successful, teachers requested additional years training and resource support to refine and consolidate their knowledge of neuroscience and inquiry pedagogy. Thus, a three-year sequence is proposed composed of summer teacher institutes, team teaching with U of MN and SMM staff, teacher peer mentoring, development of additional inquiry-based middle school neuroscience curriculum an resources, and opportunities for teachers and students to present their investigations to a wider audience. During the institutes, teachers interact with U of MN neuroscientists and visit laboratories. Participating teachers will continue to interact with project staff and peers, observing each other's classrooms and sharing implementation strategies. Teachers will report on their experiences at local, regional and/or national education and neuroscience conferences. Program materials will be available on the project website in order to reach a larger audience. Professional evaluation will assess the effectiveness of the multiyear teacher training institutes and support network as well as individual teacher performance and will be used to refine the contents of the program and middle school curriculum. The two cohorts of teachers to be trained will reach a total of 22,500 students over the life of the grant.

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**Title: CONTEXTUAL LEARNING & RESEARCH SCIENCE-- CLEAR SCIENCE****Grant Number:** 5R25RR016206-03**Project Start Date:** 8/1/2001      **Project End Date:** 7/31/2006**Institution:** WAKE FOREST UNIVERSITY HEALTH SCIEN      **Tel:** 336-716-4548  
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**ABSTRACT**      DESCRIPTION (provided by applicant): This proposal describes a comprehensive plan to: 1) develop and evaluate a biomedical science education partnership between SciWorks, The Science Center and Environmental Park of Forsyth County, and the Center of Excellence for Research, Teaching, and Learning (CERTL) at the Wake Forest University School of Medicine; 2) develop effective strategies for the dissemination of the developed model partnership; 3) use the model to inform the public about health research so that healthier life style choices are made as supported by the National Institutes of Health; and 4) engage and sustain the interest of K-12 students in science in order to increase the number of college science majors. This project is designed to foster attainment of the following specific goals through the combined resources of the partnering entities: --Develop a series of integrated science education programs anchored in contextual learning experiences designed to promote a deeper understanding of scientific health issues and related science topics. -- Deliver long-term professional development programs for K-12 teachers consistent with the strategies of contextual learning. --Develop scientific exhibits related to the promotion of healthy life style choices anchored in contextual learning strategies and directly linked to the classroom curricula, National Science Standards, and the latest research findings in specific topic areas. --Promote community awareness of healthy life style choices through parent involvement in classroom experiences, science museum activities, and in the community at-large through the portability of science museum exhibits. The program components have been designed to address these objectives as well as the broader objectives to intentionally recruit underrepresented minorities into all activities and to create a community presence of this project. Health related scientific exhibits designed for this project will have a portability component enabling their demonstration and use in school classrooms and at activities such as health fairs, health screenings, health bazaars, and health awareness events.

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**Title: INVESTIGATE HEALTH!**

**Grant Number:** 1R25RR016287-01A2

**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2006

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**ABSTRACT** This project will partner The Museum with researchers from local health science organizations, including the National Institute of Environmental Health Sciences (NIEHS) and Duke University Medical Center, to create an interactive exhibition and a series of monthly public programs. Investigate Health! will further understanding of children's health issues as visitors: 1) experiment with the science behind these issues, 2) discover that individual choice impacts well being, and 3) explore associated health science careers. The Investigate Health! project will produce a 2,100-square-foot resident exhibit containing hands-on manipulatives, interactive computer programs, a staffed laboratory area, and a resource center. The exhibition will be accessible to children and adults of diverse backgrounds and physical abilities. The 500-square-foot staffed laboratory area within the exhibit, called Health Lab, will give visitors opportunities to interact with Museum staff, health researchers, and teenage volunteers as they use scientific instruments for more in-depth explorations. A resource center within the resident exhibit will provide a comfortable place for visitors to research emerging health-related issues and gather information about accessing health care. The Health Investigator Series, monthly public programs cosponsored by the region's world-renowned medical schools and health research organizations, will bring scientists and health care professionals to speak directly to the public about the frontiers of research influencing children's health and the career opportunities available in their fields of expertise. Investigate Health! will reach more than two and a half million Museum visitors, local teachers, and teenage volunteers who will visit the resident exhibit during its life span (ideally, seven years) and take part in the enriching public presentations connected with it.

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**Title: WIDENING HORIZONS IN SCIENCE EDUCATION (WHISE)****Grant Number:** 1R25RR016306-01A1**Project Start Date:** 2/1/2003      **Project End Date:** 1/31/2008

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**ABSTRACT** DESCRIPTION (provided by applicant): Our nation's science education enterprise is engaged in a struggle to respond to astounding societal transformations such as the explosion of science knowledge and technology innovation. The impact is felt keenly in the life sciences, where the Human Genome Project, gene therapy, embryonic stem cell research, and other innovations make daily news and are destined to change our society in profound ways. In light of this transformation, the recent Third International Mathematics and Science Study (TIMSS) study revealed America's comparative decline in student science and math learning. These data, along with states adopting accountability testing, illustrate the need for reforming education in general, and science education in particular. Exacerbating the crisis are socioeconomic and geographic variables that create inequity of student access to quality science education, particularly for underrepresented populations. To resolve the crisis, innovative models for reforming science education must be developed and disseminated. Widening Horizons In Science Education (WHISE) proposes to do this, embracing a science education ecosystem approach to effecting systemic reform in a learning community, focusing on the health sciences because of their relevance to us all. Crafting an ecosystem model that weaves into one fabric multiples of institutions, disciplines, and collaborators needed for restoration of the system, requires a multifaceted, process-based approach that addresses the elements for science education reform. Therefore, WHISE proposes developing, in collaboration with three rural high minority enrollment school systems, a science education model that includes: 1) contemporary learning resources; 2) educator professional development; 3) collaboration with administration; 4) sharing science with the community; 5) adoption of information technology in instruction; 6) students experiencing the elements of reform; and 7) marketing as a strategy to attract interest in science. The centerpiece of this model will be UNC-CH's 40-foot Traveling Science and Technology Laboratory, which through the power of its visual image will bring attention to the science education crisis. The holistic nature of WHISE's design and the use of an action research approach to achieve success will lead to the creation of a program having broad application across the science learning landscape. By supporting programs like WHISE, which looks to the horizon for innovative solutions and how to reach them, the NIH will achieve its goal of increasing understanding of science, diversity of the workforce, and the health and overall quality of life of our society.

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**Title: DETECTIVES IN THE CLASSROOM - PHASE II - DISSEMINATION**

**Grant Number:** 1R25RR018584-01

**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2006

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**ABSTRACT** DESCRIPTION (provided by applicant): Our Phase II goal is to disseminate, to a wider audience, a curriculum that explores health-related issues relevant to students through the science of epidemiology. It is called Detectives in the Classroom (Detectives). This will be accomplished by: - Continuing to advocate for and prepare middle school science teachers to teach Detectives, while also advocating for and preparing teachers in a wider range of grades (high school) and disciplines (mathematics and health). - Advocating for and preparing teachers to teach Detectives in alternative educational venues: after-school and weekend programs, summer enrichment camps and workshops, and trips to science centers and museums. - Establishing Investigation Development Teams, consisting of an epidemiologist and an experienced Detectives teacher, to update and create new Detectives' investigations and, in the process, developing a broader base of Detective stakeholders. - Updating, expanding, evaluating, and revising the Detectives' web site. - Continuing to evaluate and publicize the effectiveness of Detectives in increasing students interest in science, fundamental abilities in science as inquiry, scientific literacy, and knowledge of epidemiology.

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**Title: HOPE PARTNERSHIP (HEALTH OBSERVANCES & PUBLIC EDUCATION)****Grant Number:** 1R25RR018490-01**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2008**Institution:** UNIV OF MED/DENT NJ NEWARK  
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6701 Democracy Blvd, Room 916  
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DESCRIPTION (provided by applicant): The UMDNJ-School of Public Health, through the Community Outreach and Education Program (COEP) at the Center for Environmental Health Sciences, a National Institute of Environmental Health Sciences (NIEHS) Center of Excellence at the Environmental and Occupational Health Sciences Institute (EOHSI), proposes to conduct the HOPE Partnership (Health Observances and Public Education), a five-year Phase I and II Development and Dissemination project. This program will help to improve public understanding of the biomedical and health-related sciences and the impact of research on human health, while determining the most effective outreach methods to achieve this goal. UMDNJ will direct this project in collaboration with seven COEPs based at Oregon State University, University of Arizona, University of North Carolina at Chapel Hill, University of Southern California, University of Texas M.D. Anderson Cancer Center, University of Wisconsin-Madison and Vanderbilt University. These COEPs have demonstrated their ability to collaborate to increase public understanding of the biomedical and health-related sciences through the SEPA project, entitled EH-STEP, supported through August 31, 2003. These diverse partners will ensure that the project is translatable nationwide. A public health science education model will be developed, implemented and evaluated. The model comprises six components: health observances, needs assessment, action mechanisms, public health science education materials, scientist involvement and program evaluation. Program components will capitalize on three established national health observances (Cancer Control Month, Asthma and Allergy Awareness Month and Lead Poisoning Prevention Week) to impact the target audiences (students, teacher, general public). A needs assessment will document the target audiences' perceptions, attitudes and knowledge of biomedical and health-related sciences. Utilizing the diverse experiences and expertise of this established network of NIEHS Centers and the needs assessment, the Health Observances & Public Education (HOPE) Partnership will develop public health science education materials that will be disseminated through action mechanisms: community forums, formal education, informal education, media, non-profit organizations and science centers/museums. Scientists will be involved throughout the initiative including the development of materials and the implementation of the action mechanisms. Formative and summative measures will be used to analyze all aspects, including overall project effectiveness.

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**Title: BRONX SCIENCE EDUCATION PARTNERSHIP****Grant Number:** 5R25RR015677-04**Project Start Date:** 9/30/2000    **Project End Date:** 8/31/2005**Institution:** MONTEFIORE MEDICAL CENTER (BRONX, N  
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**ABSTRACT**    DESCRIPTION (Adapted from the applicants abstract): The Bronx Science Education Partnership (BxSEP) is a collaboration between the Albert Einstein College of Medicine, Montefiore Medical Center and its School Health Program, ten Bronx public and one parochial school, the Office of School Health Programs of the New York Academy of Medicine, and the New York Hall of Science. The goals of the Partnership are to develop and evaluate a model science education partnership that strengthens teaching skills and practice in health education and the health sciences, empowers teachers to bring science resources to the classroom, and builds collaboration between teachers and school-based health clinic staff to improve student health and learning. The Partnership seeks to motivate and engage students of color in learning the science of personal health, improve student attendance and academic performance, and stimulate interest in the health sciences. BxSEP will contract with the Academy of Medicine to train teachers at participating schools along with the staff of their school-based health clinic. The Hall of Science education staff will be integrated into this training and will provide coordinated field trips and traveling laboratory kits in microbiology and immunology that reinforce the lesson plans of the health curriculum. Montefiore and Albert Einstein will create a speakers bureau that will provide clinicians and research scientists to come to the trained teachers' classrooms to further enrich the curriculum and, when possible, host class field trips to the hospital, health centers, and laboratories. Teacher self-assessments and activity logbooks and student attendance and performance will be used to evaluate the impact of the training Partnership over three years. Phase II will concentrate on dissemination. The partnership will train 50 teachers and 45 clinicians starting in year 01 and 40 new teachers in years 02 and 03.

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**Title: DISSEMINATION OF A FOOD-BASE SCIENCE & NUTRITION PROGRAM****Grant Number:** 5R25RR012374-06**Project Start Date:** 9/1/1997      **Project End Date:** 6/30/2004**Institution:** COLUMBIA UNIVERSITY TEACHERS COLLEGE  
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**ABSTRACT** DESCRIPTION (provided by applicant): The goal of this Phase II proposal is to disseminate at five sites nationwide an inquiry-based science and nutrition education program that has been developed and evaluated during our current Phase I SEPA project, named: Linking Food and the Environment: An Inquiry-Based Science and Nutrition Education program (or LiFE Program). We anticipate this dissemination program will reach 2,500 children, 100 teachers, and 250 parents. The LiFE program, geared towards inner-city children, parents and teachers, addresses a major science education goal to promote scientific literacy for all Americans and a major national health goal for people to eat healthful diets. It consists of a five-module, two-year curriculum for 4-6th grade students, that uses the study of food and food systems to address National Standards in the areas of science as inquiry; life sciences content; and unifying concepts. It also involves a series of four workshops for teachers to help them learn new science and nutrition concepts, make connections with other teachers, and successfully implement the curriculum. Finally, it involves a series of ten workshops for parents to assist them in working with teachers in the classroom, to increase their own science and nutrition literacy, and to provide them ideas of how they might extend the LiFE program into their home. An evaluation with 23 elementary school LiFE classes and 20 control classes in NYC has demonstrated that the program significantly improved children's knowledge, inquiry skills, and attitudes towards nutrition, science and nature; teacher's attitudes towards the teaching of science and nutrition; and parents' attitudes towards helping children learn science and making healthy food choices. Process evaluation indicates that parents and teachers enjoyed teaching and participating in the LiFE program and that it was an overall benefit and improvement to science and nutrition instruction in their schools. Phase II dissemination will be carried out through the following Specific Aims: 1) To disseminate the evaluated LiFE Program nationwide by: implementing our Dissemination Model with identified Dissemination Partners in five sites (20 classes per site) nationwide across three years (NYC, Philadelphia, St. Louis, Austin, and Berkeley) based on a four pronged approach: a) Direct Communication Support including an On-Site Implementation Coordinator; b) In-depth Support Packages, including implementation materials and a video; c) Mediated Communication through five Module newsletters for all teachers, e-mail and an interactive Website; and d) Connections to the Field by building and supporting

collaborations between urban school districts and community-based food, nutrition and science organizations, such as Farmers Markets as well as Science Museums. The LiFE Dissemination Model will be evaluated through process evaluation of Dissemination Partners, on-site implementation coordinator, teachers, parents, and field-based collaborators; 2) To publicize our educational products, through various professional meetings, educational clearinghouses, newsletters, and Web search engines to reach additional schools and individuals; and 3) To publish our LiFE products with an Educational Publishing Partner. This Phase II dissemination will reach about 2,500 students; 100 teachers and 100 parents. The multi-pronged approach proposed here will facilitate institutionalization of the LiFE Program.

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**Title: HEALTH SCIENCES RESEARCH: EDUCATION THE PUBLIC - PHASE I**

**Grant Number:** 1R25RR017374-01A1

**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2006

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**ABSTRACT** DESCRIPTION (provided by applicant): The fundamental objectives of the work proposed are three-fold. First, to better prepare science teachers to teach a biology course that is informed by current knowledge in the health sciences, that is driven by concepts, not facts and this is interesting and relevant to understanding human health and life on earth. Second, to provide science teachers with hands-on science kits and materials that will engage their students, better enable them to understand life processes, and encourage them to seek careers in the medical and life sciences. Third, to provide minority students under-represented in the biomedical sciences with additional opportunities to explore life sciences materials, and for some of these students to participate in sharing their knowledge and technical skills with others. 1) The project will provide experiences in medical science research to well qualified science teachers, who in turn will provide professional development and in-service support for other science teachers, all of whom teach the Living Environment (biology) curriculum. 2) The project will provide high quality science kits and other National Science Standards-based materials, and training in using and maintaining these materials, to these teachers. 3) The project will provide opportunities for students of these teachers to explore many hands-on science exhibits at the New York Hall of Science, and opportunities for some of these students to participate in the Hall of Science's high school docent program.

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**Title: INSIDE CANCER, MULTIMEDIA EDUCATION RESOURCES FOR CANCER****Grant Number:** 5R25RR015622-03**Project Start Date:** 1/29/2001    **Project End Date:** 12/31/2004**Institution:** COLD SPRING HARBOR LABORATORY    **Tel:** 516 367-5200  
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**ABSTRACT** The Internet has seen an explosive growth in the past few years, and masses of information on cancer are readily available to anyone with a live connection. Unfortunately, the vast majority of this information is presented in long text passages, with few illustrations and non multi-media elements to increase user interest. Absent are materials that help people appreciate how basic research in cancer genetics is being rapidly translated into new options for diagnosis, treatment and prevention. We seek support to create an extensive WWW site, Inside Cancer, which literally will take people into the workings of the cancer cell and into the laboratories of scientists who are revolutionizing cancer research. Building upon the project staff's strong experience in building multimedia WWW sites, Inside Cancer will make use of the most up-to-date technology to merge animation and video into a visually stimulating experience. At the same time, the project draws scientific authority from a world-renowned research institute and advisors who have played important roles in the development of modern cancer research. Five modules will be developed. What is Cancer? quickly answers this and other related questions in short animations and prepares more curious visitors for the next modules. Cancer in the Laboratory features researchers explaining animated sequences of their own experiments, which laid the foundation for understanding cancer at the molecular level. Cancer Causes and Prevention animates the molecular events triggered by carcinogens, such as tobacco smoke and diet and emphasizes how lifestyle changes can reduce cancer risk. In Cancer Diagnosis and Treatment visitors shadow doctors making a cancer diagnosis, showing the connections between cancer cell alterations and new treatment options. Pathways to Cancer takes visitors on a 3-dimensional tour of a cell and its signaling pathways, then allows them to see downstream effects of mutations and their relation to cancer development. As new findings and therapies are discovered, we will update the modules to keep Inside Cancer current.

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**Title: SCIENCE PARTNERSHIPS FOR HANDS-ON LEARNING -PHASE II****Grant Number:** 5R25RR012411-06**Project Start Date:** 9/30/1998    **Project End Date:** 8/31/2004

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**ABSTRACT** DESCRIPTION (provided by applicant): This proposal will focus on disseminating science education programming, developed as part of our Phase I SEPA project, through the development of a science inquiry center for hands-on science activities. The Life Sciences Learning Center (LSLC), at the University of Rochester Medical Center (URMC), will focus on activities for teachers and students in grades six through twelve. The purpose of this Phase II program will be: To facilitate the continued development of collaborative linkages among University of Rochester biomedical scientists, and local science teachers and students. To continue to develop innovative programming for students emphasizing hands-on, inquiry-based learning. Programs emphasizing grade-appropriate topics will be offered throughout the school year and summer. Student programs and activities will align with national and New York State science education standards. To enhance current knowledge of life sciences as well as to develop the process of inquiry in teachers via teacher professional development workshops and summer programs. Teacher workshops and a Summer Science Teacher Academy will focus on activities with current science education standards. Teachers will have use of a lending library of science equipment and supplies to perform activities in their classrooms.

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**Title: HEALTHRICH: HEALTH RISKS, INFORMATION, AND CHOICES**

**Grant Number:** 5R25RR016301-02

**Project Start Date:** 9/30/2002    **Project End Date:** 8/31/2005

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**ABSTRACT** DESCRIPTION (provided by applicant): The overriding goal of the three-year HealthRICH: Health Risks, Information, and Choices project is to build an education partnership that will improve understanding of EHS by young teens and their families through informal education events and help them make informed personal choices to reduce environmental health risks. Materials and programming will emphasize four questions that are essential to the public's understanding of human health: What is the relationship between environmental toxins and human health? What interactions exist between one's genetics and susceptibility to environmentally induced disease? How can one recognize and evaluate real and perceived risks? How can individuals gain experience in applying scientific evidence? The specific project aims are: Aim 1) Develop EHS-based informal education materials for young teen and family programming. Aim 2) Provide EHS-based training programs and supporting materials for 350 museum and science center educators, youth organization leaders, and others interested in informal education. Aim 3) Conduct young teen and family HealthRICH informal education events. Aim 4) Document and evaluate the impact of the partnership and its activities.

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**Title: BIOTECHNOLOGY/BIOINFORMATICS DISCOVERY!****Grant Number:** 5R25RR017282-02**Project Start Date:** 9/30/2002    **Project End Date:** 7/31/2005

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**ABSTRACT**    DESCRIPTION (provided by applicant): American science education still falls short in international comparisons such as Third International Mathematics and Science Study (TIMSS). Health promotion and disease prevention remain national goals for our general population. Biotechnology/Bioinformatics Discovery! proposes a collaborative effort among Oklahoma City Community College (OKCCC), the Oklahoma City Public School System (OKCPS), and the University of Oklahoma Health Sciences Center (OUHSC), that addresses all five goals of the Science Education Partnership Award program (SEPA). OKCPS is rich with students from underrepresented groups, with 85 percent of district students eligible for free or reduced lunches. OKCPS is already engaged in science education reform efforts through a NSF-funded Urban Systemic Program. Biotechnology/Bioinformatics Discovery! builds upon the successful OUHSC Health Sciences Discovery! model, extending it into the high school laboratory. Nationally developed, field-tested biotechnology and bioinformatics modules will be chosen to reflect the local biotechnology environment, which is biomedical in nature. Teacher teams will undertake professional development to bring to their students science learning rich in hands-on activities and inquiry, which is consonant with the National Science Education Standards and suits the needs of minority students. A loan center will provide supplies and equipment to support teachers in this expanded science programming. The project touches large numbers of high school students in a variety of courses, not just biology, to increase health science literacy for all students. Outreach activities to parents will promote health science literacy to the general public. OUHSC and OMRF (Oklahoma Medical Research Foundation) will provide capstone experiences with research scientists to expose students directly to the exciting world of biomedical research. The OKCCC biotechnology program will provide science education leadership and technical expertise for adapting biotechnology and bioinformatics modules to the OKCPS high school setting. Programming will include efforts to show parents and students affordable, achievable routes to college and science careers, of which the OKCCC biotechnician training program is one option. The proximal result will be larger numbers of minority students in science and graduating from high school, and the distal result, larger numbers of minority students entering college science and science careers.

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**Title: DANGEROUS DECIBELS--PARTNERSHIPS IN PUBLIC HEALTH****Grant Number:** 5R25RR015634-04**Project Start Date:** 9/30/2000    **Project End Date:** 8/31/2005**Institution:** OREGON MUSEUM OF SCIENCES AND IND    **Tel:** 5037974513  
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**ABSTRACT**    DESCRIPTION (Adapted from the applicants abstract): A consortium of innovative basic science researchers, museum educators, civic leaders and volunteers propose a unique partnership to reduce the incidence and prevalence of Noise Induced Hearing Loss (NIHL), a growing problem among children and adults. To address this critical public health concern, a unique public/private partnership, including the Oregon Museum of Science and Industry (OMSI), the Oregon Hearing Research Center at the Oregon Health Sciences University (OHSU), the Portland Veterans Administration Medical Center National Center for Rehabilitative Auditory Research (NCRAR), the American Tinnitus Association (ATA), and Oregon and Southwest Washington elementary and secondary schools, propose a regional campaign to significantly reduce the prevalence of preventable hearing loss and tinnitus. The project is comprised of three freestanding, but interlocking components that create a strong public health campaign against Noise Induced Hearing Loss. These components are: (1) exhibitry; (2) curriculum; and (3) research. We propose a three phase, five-year program, directly targeting school-age youth, using established volunteer and volunteer training programs among each of the participating institutions: Phase 1: Prototype exhibit development and full production of one exhibit incorporating education, entertainment and pre-post knowledge evaluation; test-ready curriculum; draft evaluation tools and hearing screening capabilities for data acquisition. Phase II: Classroom presentations with exhibitry and data acquisition in six Oregon and Southwest Washington for pilot testing. Phase III: Regional model program and implementation strategy for hearing science education and hearing loss prevention. Program evaluation analysis will include research results regarding subject factors and noise induced hearing loss in children.

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**Title:** THE NATURE OF AGING

**Grant Number:** 5R25RR016247-03

**Project Start Date:** 9/30/2001    **Project End Date:** 8/31/2004

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**ABSTRACT**    DESCRIPTION (provided by applicant): The Oregon Museum of Science and Industry (OMSI) proposes to create a 2,000-square-foot permanent exhibition, The Nature of Aging, and a duplicate traveling exhibition for national tour. The exhibition will focus on the biology of senescence with special emphasis on comparative aging across the animal kingdom, healthy aging, and aging of the brain. Senescence is perhaps the most complex and least understood biological process, yet it is also a universal experience marked by signs we all recognize. Aging has great relevance in the twenty-first century as medical advances and demographic shifts accelerate the growth of our elder population, and scientific research narrows in on the central mysteries of the aging process. To extend the visitor experience, OMSI will produce a series of related educational materials and programs including a family activity guide, a website, demonstrations for both exhibitions, and activities for OMSI's Life Science Lab. The exhibition is intended for a family audience, and activities will be designed to foster intergenerational interaction. The exhibits and ancillary materials will be developed with the support of the Center for Healthy Aging at the Oregon Health Sciences University (OHSU) and other experts from a diversity of fields in gerontology research and education.

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**Title:** THE HEART OF THE MATTER

**Grant Number:** 1R25RR018562-01

**Project Start Date:** 9/30/2003     **Project End Date:** 9/29/2006

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**ABSTRACT** Through the lens of cardiovascular health and wellness, The Heart of the Matter, a 5,000 square foot exhibition, will explore the science and technology that support medical efforts, advances, and discoveries. In order to promote interest and education in the basic science that underlies the health sciences, The Heart of the Matter draws on the popularity and educational value of the Institute's venerable walk-through Heart exhibition, and increasing and widespread concern over cardiovascular health. The exhibit uses hands-on activities, multimedia experiences, and computer interactives to introduce visitors to concepts of physiology, human biology, and health. For outreach and dissemination purposes, The Heart of the Matter also benefits from collaborative efforts with the American Heart Association and with area hospitals including Drexel University's Hahnemann Hospital and the nursing school of Thomas Jefferson University. With The Franklin Institute's walk-through heart serving as the exhibit's gateway to learning, visitors use the tools and techniques of medicine to investigate the human body and to evaluate their own health-related choices. The Heart of the Matter. ? Provides visitors with an introduction to basic concepts of human biology and physiology; ? Introduces visitors to the scientific research and development which is generating new medical techniques and technologies; and ? Encourage visitors to be proactive in making choices that affect their health.

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**Title: TISSUE ENGINEERING SHOW AND EDUCATIONAL PARTNERSHIP****Grant Number:** 5R25RR015619-04**Project Start Date:** 9/30/2000    **Project End Date:** 8/31/2005

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**ABSTRACT**    DESCRIPTION (Adapted from the applicants abstract): The investigators address a major educational challenge by introducing a novel format and content for science education, (a) building on past successes; (b) combining development and dissemination at a new level; and (c) centered around an interactive planetarium show aimed to inform the public on an emerging scientific discipline and medical field: Tissue Engineering. For achieving a multitude of goals, the investigators propose the establishment of a unique partnership in scientific and medical education, bringing together university researchers, clinical leaders, science center experts, and students, educators and community representatives at all levels. The project is catalyzed by the Pittsburgh Tissue Engineering Initiative, a non-profit organization dedicated to the promotion of tissue engineering and its application to improving people's lives. The main goals fall in three categories, as follows: Education: - To communicate scientific information about the human body (principles of function will be emphasized over specific facts or terminology by focusing on a limited but fundamental set). -To convey the excitement and importance of tissue engineering research. The show will utilize engaging interactive demonstrations of tissue functions and illustrate the medical uses and potential of this field. Innovation: - To enhance the educational experience. The developers will use group-interactive technology as a tool for education by engaging participants as participants in the processing functions of the body. A special visualization/interactivity laboratory will be used where prototype interactive scenarios will be tested using focus groups, consultants and representatives of the target audiences. Dissemination: - To insure national distribution to other planetaria. The presentation system will utilize portable interactive technology (to be developed). It will be deployed to planetaria throughout the country, coordinated by the Association of Science and Technology Centers (ASTC). - To engage the target audience in the development process. Content development will be achieved by a consortium of leading research universities and medical centers, with input from a panel of world-class experts. Visualization, interactivity and sound technologies will be developed in Pittsburgh, in a unique collaboration between the arts and sciences, based on past successes. Evaluation activities will be extensive, as will the range and targets of the spin-off educational materials. The Carnegie Science Center planetarium itself will serve in achieving group immersive visualization, akin to virtual reality, for improving target audience involvement. The expected outcome is a new way of delivering educational content, and a better understanding of the emerging field of tissue engineering by the general public.

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**Title: PUERTO RICO BIOMEDICAL RESEARCH EDUCATION PROGRAM**

**Grant Number:** 1R25RR017415-01

**Project Start Date:** 1/1/2003      **Project End Date:** 12/31/2005

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**ABSTRACT**      DESCRIPTION (provided by applicant): The main goal of the Biomedical Research Education Program (PR-BREP) proposed by the University of Puerto Rico Medical Sciences Campus (UPRMSC), is to improve the knowledge of K-12 Puerto Rican children about biomedical research focusing on diseases and disorders that disproportionately impact our population. This should increase the number of students who pursue graduate degrees in the biomedical sciences. To achieve this goal we propose to develop following five initiatives: Student Enrichment Program, Professional Development Program, Summer Internship Program, Mini-Grants Awards Program, Community Outreach Program. Special emphasis will be given to topics such as: diabetes, diseases of the heart, cancer, hypertension, obesity, AIDS, and cerebrovascular diseases, which are closely related with the leading causes of death in Puerto Rico and other Hispanic/Latino groups. We are confident that this comprehensive approach will improve the interest and knowledge of K-12 students in biomedical research as well as the importance to consider a biomedical career that will help to minimize the diseases associated with the leading causes of death in the Puerto Rican population.

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**Title:** SCIENCE LABORATORY

**Grant Number:** 1R25RR018542-01

**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2006

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**ABSTRACT** DESCRIPTION (provided by applicant): The USC College of Science and Mathematics ScienceLab will be developed as a hands-on, discovery-oriented teaching laboratory where middle and high school science teachers and students can interact with university research groups in an extended experience of cutting edge bioscience. It will be modeled after Boston University School of Medicine's highly successful CityLab and will use some of the laboratory investigations developed by CityLab. Additional laboratory investigations will be developed by USC research teams based on their research expertise. A unique feature of ScienceLab will be that each laboratory investigation will be the responsibility of a particular laboratory research team. These teams will consist of a faculty member(s) and the postdoctoral fellows, graduate students, undergraduates, and technicians who work together on a particular research project. They will be responsible not only for developing the details of a particular laboratory investigation that is based on their research project, but also for conducting that investigation with science teachers and their students. These activities will be tied to the National Science Standards. During the summer, a graduate course will be offered to science teachers that will include mentored instruction of students participating in the laboratory investigations at ScienceCamp.

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**Title: TEACHING SMART:STAFF DEVELOPMENT FOR SCIENCE EDUCATION****Grant Number:** 5R25RR015657-03**Project Start Date:** 9/30/2001     **Project End Date:** 8/31/2004**Institution:** YOUTH AND FAMILY SERVICES, INC.     **Tel:** 6053424195  
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**ABSTRACT**     DESCRIPTION (provided by applicant): Teaching SMART(R), A Program of Girls Incorporated of Rapid City (South Dakota), a division of Youth & Family Services, is a comprehensive, research-based, three-year teacher professional development program designed to produce systemic change in the classroom through improving science education at the elementary school level. The mission of Teaching SMART is to encourage the performance and persistence of all students, particularly girls and minority youth, in elementary science, increasing the probability that they will major in science in college and ultimately pursue a health sciences related career. To achieve this end, Teaching SMART provides instruction, hands-on training, and long-term technical assistance and support for third through fifth grade teachers which increase their awareness of and comfort level in using equitable, hands-on inquiry, and exploration based approaches to teaching science. The success of Teaching SMART program has been proven by five years of independent evaluation, conducted by Dr. Marsha Lakes Matyas and Dr. Ann Haley MacKenzie, and is based on its long-term commitment to educational reform, which is accomplished through a comprehensive professional development training model. For this NIH funded project, Teaching SMART will add a new component to the existing model by partnering with working scientists at each of the new sites to improve student understanding of science and increase the interest of young people in health science careers. Teaching SMART will provide training and long-term technical assistance for up to 150 elementary school teachers in Teaching SMART methods and philosophies, which includes increasing their awareness of and skills in addressing gender equity and cultural issues. It will impact approximately 6,200 students over the three-year funding period. The goal of the Teaching SMART Staff Development for Science Education Program are: 1) To positively impact the way teachers teach science; 2) To positively impact students' cognitive skills in science; and 3) To positively impact student attitudes in science.

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**Title: DISCOVERY LAB: A PARTNERSHIP FOR SCIENCE EDUCATION****Grant Number:** 1R25RR018595-01**Project Start Date:** 9/30/2003    **Project End Date:** 9/29/2006**Institution:** BAYLOR COLLEGE OF MEDICINE  
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**ABSTRACT** DESCRIPTION (provided by applicant): Houston area school children rarely have the opportunity to experience biomedical science in a discovery oriented, hands-on manner. Baylor College of Medicine (BCM) and the Museum of Health & Medical Science (MHMS) possess extraordinary resources for educational outreach that can provide innovative and unique inquiry-based science education for public school students and their teachers. To establish such innovative opportunities, BCM, the Houston Annenberg Challenge, and the MHMS propose the development of a Phase I educational outreach program targeting K-12 students and teachers in the greater Houston area. The long-term goals of this program are threefold. First, to provide Houston area students with innovative opportunities to explore molecular biology and heredity in a hands-on, inquiry-based manner. Second, to provide Houston area teachers with new opportunities for training, continuing education and state-of-the-art curriculum development. And, third, to train BCM graduate students to be role models, career mentors, and educators for the rest of their scientific careers. The program, called Discovery Lab, will partner BCM graduate students with HISD students and their teachers. The activities of Discovery Lab will be designed for implementation in even the most basic classrooms, making the opportunities of Discovery Lab accessible to all Houston area students and teachers. Discovery Lab will use commercially available, field-tested, educational kits that explore heredity, DNA and molecular biology. The Discovery Lab curriculum will also include printed and web-based materials, fully illustrated student manuals, pre- and post-visit tests, evaluation forms, and instructional support. Further, teachers will be trained in the Discovery Lab curriculum units during summer workshops so that they can incorporate the modules into their regular teaching activities. We will expand our successful pilot Annenberg Summer Science Internship, a six week program that put teacher/student pairs in BCM research laboratories during the Summer of 2002. The success of Discovery Lab activities will be evaluated through pre- and post-visit tests and evaluations to be completed by both students and teachers and the results used to improve and reorganize the activities of Discovery Lab, as needed, to optimize its objectives. Through the activities of Discovery Lab, we will enhance the understanding of science for Houston area school children by providing laboratory-style experiences and expert instruction that would otherwise be unavailable. Teachers will have the opportunity to interact with working scientists, learn new skills, and acquire a new curriculum they can permanently adopt in their classrooms. Importantly, Discovery Lab will train graduate students to be lifelong mentors, encouraging them to reproduce Discovery Lab in their future academic positions. A major outcome of this project will be the

creation of a model program for science education that can be implemented nationwide.

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**Title:** MICROMATTERS

**Grant Number:** 1R25RR018605-01

**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2008

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**ABSTRACT** DESCRIPTION (provided by applicant): In this Phase I/II application, we describe a comprehensive plan for the development and dissemination of unique, interdisciplinary educational materials on infectious diseases, including HIV/AIDS, for middle school audiences. The proposed MicroMatters project involves major scientific and educational partnerships at national and local levels during all phases. Project activities will reach more than 36,000 students in grades 5-8 and their teachers. The project aims to increase understanding by middle school students, their teachers and their families of infectious diseases, biomedical research, healthy lifestyle choices, risk factors for disease, and the everyday relevance of science; stimulate middle school students' interest and awareness of science/health careers; and promote science/health teaching and learning through guided inquiry. The MicroMatters project will: (1) Develop a new interdisciplinary model for middle school science and health instruction that includes life science, personal health, career awareness and the assumption of responsibility for one's own actions; (2) Create, evaluate, revise and publish three units of teaching materials (Infection and Disease; HIV/AIDS - A Modern Pandemic; Diseases in the Global Age); (3) Evaluate the effectiveness of the new units with diverse populations of teachers and students; (4) Promote adoption and use of the new materials by teachers, schools and parents through dissemination and sustained teacher professional development at each of 10 partner dissemination sites; (5) Provide ongoing user support and direct opportunities for teachers to interact with one another, other educators and scientists through face-to-face and asynchronous electronic pathways; (6) Evaluate the effectiveness of the dissemination model in promoting ongoing use of the materials in classrooms by teachers and students. MicroMatters will capitalize on ten years of experience at Baylor College of Medicine (BCM) in the creation and dissemination of interdisciplinary, standards-aligned science educational materials for elementary and middle school students. Successful Baylor-created materials include BrainLink and My Health My World. Both are now published and distributed nationally. Proposed project partners include: Baylor's Center for AIDS Research; Centers for AIDS Research National Executive Committee; American Physiological Society; Carolina Biological Supply Company; Texas Rural Systemic Initiative; Houston Independent School District; and partnerships led by Centers for AIDS Research at Case Western Reserve University, Emory University, New York University, Northwestern University/University of Wisconsin/Chicago Public Schools, Tufts/Brown Universities, University of Alabama-Birmingham; University of California-San Diego, and University of Washington.

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**Title: MIDAS PROJECT/MODEL/IMPLEMENTATION/DISSEMINATION/EHS****Grant Number:** 1R25RR018634-01**Project Start Date:** 9/30/2003    **Project End Date:** 9/29/2008**Institution:** UNIVERSITY OF TEXAS MD ANDERSON CA    **Tel:** 7137922282  
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**ABSTRACT** DESCRIPTION (provided by applicant): The Center for Research on Environmental Disease (CRED) of the UT MD Anderson Cancer Center (UTMDACC) is requesting funding for a five year combined Phase I and Phase II project to launch a fully integrated dissemination and implementation program of environmental health and science education. Phase I includes development of an implementation plan that integrates environmental health and science modules across existing K-12 curriculum in a model school system. Phase II includes continuation and expansion of a statewide teacher training institute for K-12 educators. The implementation model includes integration of new environmental health and science education modules and curricular enrichment through a seminar series, a field trip program and student projects. All activities and modules are coordinated through age-appropriate research and educational themes. These elements will be thematically interwoven into the existing curricular framework and are designed to exceed statewide scholastic requirements. The underlying conceptual basis is to provide a self-sustaining, integrated curriculum in the schools that utilizes existing local and accessible resources and infrastructure. The seminar series will include a balanced presentation of environmental health and science issues from experts in the field including representatives from many local and state agencies and leading biomedical research institutions. Field trips to educational sites, parks, facilities, museums, and universities will engage students and reinforce environmental health and science lessons. The Phase II dissemination program will serve as a curricular foundation for the integrated K-12 implementation model of environmental health and science education by introducing new educational modules and materials. The Environmental Health Sciences Summer Institute (Summer Institute), will provide bilingual environmental health and science training and education to Texas teachers resulting in enhanced classroom learning for more than 75,000 students. This professional development paradigm for improving environmental health and science education will be used to disseminate new and innovative curricular materials developed by several of the nation's leading science research institutions. Formative and summative analyses will be used to measure the effectiveness of statewide dissemination of environmental health science curricular materials and the development of the integrated K-12 implementation model. Scientific and educational advisory boards will monitor the progress of the project, provide directional assistance and identify resources. In today's society the challenge of fully understanding the impact of environmental exposures on human health continues to increase in complexity. This project seeks to improve the understanding of environmental health and science by teachers and their students and enable both to

make informed decisions about the environment and their health.

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**Title:** MY HOME, PLANET EARTH

**Grant Number:** 5R25RR015676-04

**Project Start Date:** 9/30/2000    **Project End Date:** 8/31/2005

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**ABSTRACT**

DESCRIPTION (Adapted from the applicants abstract): The Children's Museum of Houston (CMH) and Baylor College of Medicine (BCM) propose to create and travel a museum exhibit on children's environmental health for a target audience of children 5-10, their parents, caregivers and teachers. The proposed Phase I and II exhibit and support programs project, My Home Planet Earth (MHPE), will be based on the NIH-funded, interdisciplinary My Health My World educational program developed at BCM and disseminated nationally. The aims of the project are to: (1) expand understanding by children (ages 5-10) and their caregivers of the health consequences of human-induced changes in the environment and increase their abilities to make healthful decisions through informal self-directed activities in a museum setting; (2) encourage linkages between formal and informal education settings by providing a model for connecting classroom-based curricula to museum-based exhibits and informal learning programs, based on the My Health My World educational materials and the My Home Planet Earth exhibit and support programs; (3) help parents provide additional environmental health-related informal learning experiences for their children, and promote awareness of science and health careers; and (4) Partner scientists and educators in the creation of a model environmental health sciences exhibit and support program for the field of family-centered informal learning that will encourage the development of additional traveling and long-term exhibits and programs on topics relevant to environmental health issues. The exhibit and support programs will visit 18 youth museums, science centers and health museums over six years of travel (four years beyond requested NIH support). An estimated 1.5 million visitors will participate in the project. In addition to these visitors, 1,000 families will participate in a MHPE Family Learning Event, 9,000 teachers will be introduced to the My Health My World curriculum-360 of whom will participate in a day long MHMW workshop, 36 scientists will partner with host museums to enhance the learning and community impact of the project, and 180,000 children will visit the exhibit during a school field experience. Special efforts will be made to facilitate museum attendance by under represented minority students and their families through contractual agreements with host sites, the use of bilingual Spanish- English signage and printed materials and links to local schools.



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**Title: POSITIVELY AGING: OPTIMIZING MOBILITY ACROSS LIFE****Grant Number:** 1R25RR018549-01**Project Start Date:** 9/29/2003    **Project End Date:** 8/31/2008

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**ABSTRACT** DESCRIPTION (provided by applicant): This SEPA application is a Phase I and II application to create, evaluate, and disseminate new teaching materials centered on the inter-related areas of mobility and obesity for the Positively Aging program. The National Institute on Aging (NIA) and the Surgeon General's Office have underscored the importance of physical activity and health maintenance across the life span. This application will utilize information from patient-oriented clinical research related to mobility and obesity as examples to create lessons and activities that effectively teach scientific and mathematical principles dealing with forces and motion at the middle school level. The Positively Aging program is an active ten-year innovative interdisciplinary partnership between the working scientists of the Aging Research and Education Center (AREC) of the UTHSCSA and middle school educators in San Antonio, TX. The Positively Aging program has three long-term goals: 1. to provide innovative, effective teaching materials that center on math and science curricular elements and are based on examples from the Gerontologic Sciences; 2. to help students learn to make critical, life determining decisions for extending and enhancing their own lives; and 3. to help students develop a sensitivity to the needs and concerns of the aging population. For the present application, we designed three specific aims to achieve these long-range goals: 1. To create new instructional materials focused on mobility and obesity that teach students: (A) Scientific and mathematical concepts of forces and motion; (B) The associations between mobility, obesity, disease, and disability across the life span; (C) Activities that promote healthy nutritional and activity habits across the life span. 2. To develop a cohesive set of quantitative evaluation strategies to determine whether the new Positively Aging instructional program improve: (A) Knowledge and skills specific to State of Texas and National Standards for math and science curricular objectives; (B) Knowledge specific to the associations between mobility, obesity, disease, and disability; (C) Knowledge and skills regarding healthy nutrition and activity habits. 3. To disseminate the new materials through the internet and teacher workshops.

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**Title: U.T.-PAN AMERICAN'S MODEL BIOSCIENCES EDUCATION PROGRAM.****Grant Number:** 5R25RR016248-03**Project Start Date:** 8/15/2001     **Project End Date:** 7/31/2004**Institution:** UNIVERSITY OF TEXAS-PAN AMERICAN     **Tel:** 5123812011  
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**ABSTRACT**     DESCRIPTION (provided by applicant): The overall goal of the proposed University of Texas-Pan American's Model Biosciences Education Project is to develop a biotechnology and medical laboratory science curriculum and establish a regional biotechnology learning laboratory (hereafter, Regional Biotech) that will provide hands-on inquiry based educational experiences in biotechnology and laboratory science for middle and high school students in the Rio Grande Valley region of Texas. Regional Biotech will enable biomedical scientists, clinical laboratory scientists and educators to teach middle/high school students and their teachers modern biotechnology laboratory techniques including practical applications of these techniques to the diagnosis of human diseases. Many school districts are reported to lack the resources students and teachers need to conduct inquiry based hands-on science, particularly biotechnology and this shortcoming is cited as one of the reasons middle and high school students perform poorly in science. Scarcity of resources in school districts is worse in the Lower Rio Grande Valley, a four county region situated along the south Texas border with Mexico and comprising 30 independent school districts with a predominantly Hispanic population. Regional Biotech will be a centralized laboratory, strategically located at the University of Texas Pan American (UTPA). We will augment two newly remodeled laboratories with state-of-the-equipment plus laboratory personnel to provide laboratory facilities daily for students and their teachers. The curriculum and experiment modules will be drawn from cell and molecular biology, clinical chemistry, immunology, hematology, immunohematology, and microbiology. Students in all schools in the region, eight percent of who are recognized as economically disadvantaged, will be targeted. We are confident of succeeding in fully implementing this project because of the following: biomedical expertise; existing partnerships between UTPA and area school districts; experience in developing and implementing pre- college biomedical science enrichment programs for predominantly Hispanic students; the commitment of the UTPA administration; the urgent needs of a community located in one of the nation's poorest standard metropolitan statistical area; and the strong support we receive from the community.

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**Title: GENOME SCIENCE EDUCATION PROGRAM****Grant Number:** 5R25RR016291-03**Project Start Date:** 7/15/2001     **Project End Date:** 6/30/2006**Institution:** UNIVERSITY OF UTAH  
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**ABSTRACT** DESCRIPTION (provided by applicant): The completion of the first draft of the human genome sequence has brought public attention to genome science, raising questions about how advances in this field will affect health, personal and societal issues. With current research evolving at an extraordinary pace, however, the gap between leading-edge research and the scientific literacy of the general public continues to expand. Located in the midst of genome, proteome, medical genetics and classical genetics and classical genetics research at the University of Utah, the Genetic Science Learning Center (GSLC) is an established education program for teachers, students and lay audiences. The goal of the GSC is to bridge this knowledge gap, combining Internet-based educational materials with teacher professional development workshops and public courses to increase genetics literacy and enabling individuals to make informed decisions. The Genome Science Education Program (GSEP) represents a continuation of this effort. This multifaceted approach to genome science education and awareness will explore genome science research and its applications in medicine and society, providing a rich educational experience for teachers, students in grades 7-12 and the lay public. Multidisciplinary working groups will develop the programs in layers, with up-to-date units presented yearly in the areas of Genome Science Technology, Genomic Approaches to Common Disease and Human Traits, Genomic Approaches to Evolution Studies, and Ethical, Legal and Social Issues Related to Genome Science. Inquiry-based, interactive educational materials that survey the basics of molecular biology and genetics and delve deeper into more advanced topics will be published free of charge on the Internet. In house and outreach teacher training workshops will utilize and supplement Internet materials to further professional development of science teachers in Utah, the Intermountain region and nationwide. Public courses conducted in partnership with the Utah Museum of Natural History will bring a human face to genetics research, presenting genome science in an accessible and engaging way. Built-in formative evaluation at every stage of the program will provide critical feedback for improving content, delivery and usability of educational materials. The GSEP project represents the development and functional testing of an innovative model for improving the science literacy of teachers, student and the lay public.

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**Title: PARTNERSHIP FOR RESEARCH & EDUCATION IN PLANTS****Grant Number:** 1R25RR018529-01**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2008**Institution:** VIRGINIA POLYTECHNIC INST AND ST UNIV    **Tel:** 7032317110  
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**ABSTRACT** The Fralin Biotechnology Center at Virginia Tech, in collaboration with university-based scientists and high school biology teachers, seeks support for developing (Phase I) and disseminating (Phase II) the Partnership for Research & Education in Plants (PREP). PREP was initiated at the request of high school students and their teachers, who wanted opportunities to collect 'real' science data, and scientists, who needed extra help in studying the 'white mouse' of the plant world, *Arabidopsis thaliana*. In an effort to better understand plant biology, scientists have sequenced the *Arabidopsis* genome. Now that the genome has been sequenced, emphasis is being placed on systematically identifying the function of an estimated 29,000 genes. One approach being taken is 'knocking out' each gene to determine its role in the growth, development, and physiology of the plant. This effort is creating an abundance of mutant plants, which must now be examined to determine each gene's function. In PREP, scientists provide wild-type and knock-out mutant seeds as well as experimental know-how to students as the students themselves design and conduct experiments to study the differences between wildtype plants and the previously uncharacterized mutants. Students then share their findings with PREP scientists at poster sessions and in lab reports. This partnership will continue to function as a collaboration with the following goals: to create a framework for sustainable partnerships between high school biology teachers, their students, and scientists; to share knowledge and research about biology; to provide students with opportunities to collect, analyze, draw conclusions about, and share real data; and to add to the body of data about genetics, genomics, and physiology, specifically of *Arabidopsis thaliana*. We propose to enhance and expand PREP in the following ways: improve student understanding of additional standards-based biology concepts (heredity and evolution, as well as ethical, legal, and social issues related to biotechnology) in the context of investigating wild-type and mutant *Arabidopsis* plants; increase the number of PREP scientist partners; enhance communication between geographically-separated PREP partners using web-based resources and technologies; disseminate PREP to a national audience via regional leadership centers and web-based approaches; and assess and describe the impact of PREP on participating teachers, students, and scientists.



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**Title:** YOUTH TAKE HEART (PHASE I & II)

**Grant Number:** 1R25RR018633-01

**Project Start Date:** 9/30/2003    **Project End Date:** 9/29/2008

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**ABSTRACT**

DESCRIPTION (provided by applicant): As atherosclerosis, obesity, and sedentary habits are known to be formed in childhood and adolescence, cardiovascular education among our youth today could have a major impact on reducing the incidence and prevalence of heart disease in the future. The Youth Take Heart (YTH) program is a collaborative project between the University of Washington Engineered Biomaterials Engineering Research Center (UWEB ERC), The Hope Heart Institute (HHI), and the Washington Mathematics, Engineering, Science Achievement (MESA) program. Phase I will focus on four main components: 1. Development/testing of an interactive Internet and CD-ROM program titled Guy Simplant: The Heart (the character Guy Simplant was created by UWEB to introduce biomaterials to middle school students) to teach about the anatomy and physiology of the heart, heart disease prevention, and newly emerging bioengineering solutions for repairing or replacing the heart; 2. Development of a corresponding cardiovascular health laboratory kit and curriculum module by leading health/science teachers and scientists; 3. Development of a YTH public lecture and parent training series and; 4. Creation of a YTH newsletter and brochures. Phase II will focus on the dissemination of the Guy Simplant game, curriculum, laboratory kits, newsletters, brochures, and implementation of the lecture series using a collaborative model of marketing and dissemination. We will primarily target approximately 5,000 MESA students (80% of whom are under-represented minorities and women). Our ultimate goal is to reach all youth in WA and the nation specifically targeting under-served populations who traditionally lack information on careers in math, engineering, medicine and science, and who are also at higher risk for cardiovascular disease. The project will fulfill WA State's Essential Academic Learning Requirements in Science and Health 1-3 and provide tools for understanding scientific concepts and principles. The project uses the federal government's Healthy People 2010 initiative guidelines, which challenge individuals and communities to take steps to ensure good health and a long life are enjoyed by all. Youth Take Heart will help enhance the cardiovascular health and quality of life for numerous students through the teaching of medical management, prevention, and control of risk factors for heart disease.

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**Title: PROFESSIONAL DEVELOPMENT FOR THE MILWAUKEE PUBLIC SCHOOL****Grant Number:** 3R25RR015236-03S1**Project Start Date:** 9/30/2000      **Project End Date:** 8/31/2004**Institution:** MILWAUKEE SCHOOL OF ENGINEERING      **Tel:**  
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**ABSTRACT** The long term goal of this project is to help high school science teachers develop an investigative approach to teaching biology for all students that: 1) integrates fundamental biological concepts from the molecular to the organismal level, 2) provides an investigative approach predicated on physical and computer modeling and hands-on experimentation, and 3) integrates the physical sciences and mathematics. The specific aim of this project is to create a comprehensive professional development program for high school science teachers in the Milwaukee Public Schools (MPS), an urban district with a high minority student enrollment. The program will create partnerships between MPS teachers and university biomedical scientists to provide a range of professional and leadership opportunities aligned with the on-going MPS curriculum reform efforts. This project is designed to achieve a NCRR SEPA goal-- active biomedical scientists working as partners with educators to improve K-12 student understanding of the health sciences --- and to achieve the educational goals of MPS. This will be done by utilizing the resources of a well-established, successful professional development program at the University of Wisconsin-Madison, the innovative technologies for science education at the Milwaukee School of Engineering, and the human and physical resources of the Medical College of Wisconsin, the Blood Center of Southeastern Wisconsin, and the UW Campuses at Milwaukee and Parkside. We propose a three year project that has, in each year, a summer component and an academic year follow up and support component. The project will provide a comprehensive professional development program for each year's cohort of 15 - 25 MPS high school science teachers. Over the 3 years, we expect to directly reach between 45 and 75 MPS high school biology and chemistry teachers; indirectly we expect to reach the entire high school science faculty of MPS. Two complementary and supporting programs we will develop in this project are: a.) internship opportunities for young scientists, and b.) internships for preservice teachers. For a given teacher cohort, a three week summer course in year 1 is followed in years 2 and 3 with opportunities to design and test curricula with peers and with students, to design and test physical models for use in the classroom, or to engage in a summer research experience in the laboratory of a biomedical researcher. Academic year follow-up and support will facilitate the creation of a community of learners within the Milwaukee Public School system.

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**Title: SMART TEAMS: PROJECT-BASED PROFESSIONAL DEVELOPMENT****Grant Number:** 1R25RR018498-01**Project Start Date:** 9/30/2003    **Project End Date:** 8/31/2005

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**ABSTRACT** DESCRIPTION (provided by applicant): The goal of this project is to disseminate a highly successful professional development program that provides high school teachers with updated knowledge and unique tools to help their students understand biology at the level of biomolecular structure and function. This program links teachers and students with the real world of science. This project consists of two components. First, we will disseminate nationally a professional development program for high school science teachers, Genes, Schemes, Molecular Machines, that has been developed, tested and refined during a phase I SEPA grant. The program involves an approach to teaching biomolecular structure and function that integrates computer and physical modeling. We will work with three sites; San Diego, Salt Lake City, and upstate New York. These sites were chosen because of the existence of strong extant professional development programs, the enthusiasm of the program staffs to engage their teachers in this approach, and the identification of cadres of teachers motivated to participate. Second, we will continue to further develop a student enrichment program in which teachers who have participated in our professional development program form SMART Teams (Students Modeling A Research Topic), that design and build a physical model of a protein or other molecular structure that is being investigated in a local biomedical research laboratory. This approach bridges the gap that currently exists between the classroom and the world of an active research laboratory. In this project component, we will work with teachers and SMART Teams drawn from the greater Milwaukee area and the state of Wisconsin. An important new component of our local effort will be the exploration of a collaboration with the Digital Literacy Team of the Discovery World Museum to more effectively communicate the accomplishments of the SMART Teams to a wider audience of educators, parents and the general public.

